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CLAIMS

We claim:

1.   A method to train image classification, comprising

measuring noise in a first image; and

10   training a classification model from the noise to classify a second image as a

natural image versus an artificial image from noise.

2.   The method of claim 1, wherein measuring noise further comprises:

generating a noise-reduced third image from the first image;

15   determining the difference between the first image and the third image;

and

aggregating the difference into a noise feature vector, and

wherein training a classification model from the noise further comprises:

training a classification model from the noise feature vector.

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3.   The method of claim 1, wherein generating a noise-reduced third image further
comprises:

applying a median filter to the first image.

25   4.   The method of claim 1, wherein generating a noise-reduced third image further
comprises:

applying a Gaussian filter to the first image.

5.   The method of claim 1, wherein generating a noise-reduced third image further

30   comprises:

applying a Wiener filter to the first image.

6.   The method of claim 1, wherein the first image further comprises a frame in a
video stream.

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7. A method to train image classification, comprising:

generating a feature vector from an image; and

training a classification model to classify a second image as a slide image versus a comic image, from the feature vector.

8. The method of claim 7, wherein generating a feature vector from an image further comprises:

generating an aggregated feature vector from an image.

9. The method of claim 7, wherein generating a feature vector from an image further comprises:

generating a feature vector from any combination of at least one feature of an image selected from the group consisting of at least on text block feature of the image, at least one edge feature of the image, at least one aspect ratio of the image.

10. The method of claim 7, wherein the image further comprises a frame in a video stream.

11. A method to classify an image as a slide image versus a comic image, comprising:

receiving a feature vector of the image;

classifying the image as slide image versus comic image, from the feature vector; and

generating the classification of the image.

12. The method of claim 11, wherein the classification is performed on a set of video frames of a video sequence, and the most likely classification result emerging out of the classification results of the individual frames is taken as the class of the video sequence.

13. The method of claim 11, further comprising:

5   generating a feature vector from any combination of at least one feature of an

image selected from the group consisting of at least on text block feature

of the image, at least one edge feature of the image, at least one aspect

ratio of the image.

10   14.   A method to classify an image as natural image versus artificial image, further

comprising:

        receiving a feature vector of the image;

        classifying the image as natural image versus artificial image, from the feature

vector; and

15   generating the classification of the image.

  15.   The method of claim 14, wherein the classification is performed on a set of video

frames of a video sequence, and the most likely classification result emerging out of the

classification results of the individual frames is taken as the class of the video sequence.

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  16.   The method of claim 14, wherein the feature vector further comprises a noise

vector.

  17.   The method of claim 14, wherein the feature vector further comprises a sharpness

25   vector.

  18.   An image classification system comprising:

        a feature extraction component, extracting a feature that distinguishes an image

            between a naturally-looking image versus an artificially-looking image;

30   and

        a training system, operably coupled to the feature extraction component.

  19.   The system of claim 18, wherein the image further comprises a frame in a video

stream.

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5   20.   The system of claim 18, wherein the classification is performed on a set of video

frames of a video sequence, and the most likely classification result emerging out of the

classification results of the individual frames is taken as the class of the video sequence.

21.   A system to classify an image comprising:

10   a processor;

a storage device coupled to the processor;

software means operative on the processor to train classification of at least one of

images as either a natural image or an artificial image.

15   22.   The system of claim 21, wherein the at least one image further comprises at least

one frame in a video stream.

23.   The system of claim 21, wherein the software means further comprises:

a generator of a noise vector of each of the at least one image.

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24.   A system to classify an image, comprising:

a processor;

a storage device coupled to the processor;

software means operative on the processor to train classification of at least one

25   image as either a slide image or an comic image.

25.   The system of claim 24, wherein the at least one image further comprises at least

one frame in a video stream.

30   26.   The system of claim 24, the software means further comprising:

a generator of a feature vector from any combination of at least one feature of an

image selected from the group consisting of at least on text block feature

of the image, at least one edge feature of the image, at least one aspect

ratio of the image.

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27. A system to classify an image, comprising:

a processor;

a storage device coupled to the processor; and

software means operative on the processor to classify an image as either a natural

image or an artificial image.

28. The system of claim 27, wherein the image further comprises a frame in a video stream.

29. The system of claim 27, wherein the software means further comprises:

a generator of a noise vector of the image.

30. A system to classify an image, comprising:

a processor;

a storage device coupled to the processor; and

software means operative on the processor to classify an image as either a slide

image or an comic image.

31. The system of claim 30, wherein the image further comprises a frame in a video stream.

32. The system of claim 30, the software means further comprising:

a generator of a feature vector from any combination of at least one feature of an

image selected from the group consisting of at least on text block feature

of the image, at least one edge feature of the image, at least one aspect

ratio of the image.

33. A computer-readable medium having computer-executable instructions to cause a computer to perform a method comprising:

generating a feature vector from a first image; and

5 training a classification model to classify a second image as a natural image
versus an artificial image, from the feature vector.

34. The computer-readable medium of claim 33, wherein the first image further
comprises a frame in a video stream.

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35. The computer-readable medium of claim 33, wherein the feature vector further
comprises a noise feature.

36. The computer-readable medium of claim 33, wherein the feature vector further
15 comprises a edge-sharpness feature.

37. A computer-readable medium having computer-executable instructions to cause a
computer to perform a method comprising:
        generating a feature vector from a first image; and
20   training a classification model to classify a second image as a slide image versus a
                comic image, from the feature vector.

38. The computer-readable medium of claim 37, wherein the first image further
comprises a frame in a video stream.

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39. The computer-readable medium of claim 37, wherein the generating a feature
vector from a first image further comprises:
        generating a feature vector from any combination of at least one feature of an
                image selected from the group consisting of at least on text block feature
30   of the image, at least one edge feature of the image, at least one aspect
                ratio of the image.

40. A computer-readable medium having computer-executable instructions to cause a
computer to perform a method comprising:
35   receiving a feature vector of the image;

classifying the image as slide image versus comic image, from the feature vector; and

generating the classification of the image.

41. The computer-readable medium of claim 40, wherein the classification is performed on a set of video frames of a video sequence, and the most likely classification result emerging out of the classification results of the individual frames is taken as the class of the video sequence.

42. The computer-readable medium of claim 39, wherein the method further comprises:

generating a feature vector from any combination of at least one feature of an image selected from the group consisting of at least on text block feature of the image, at least one edge feature of the image, at least one aspect ratio of the image.

43. A computer-readable medium having computer-executable instructions to cause a computer to perform a method comprising:

receiving a feature vector of the image;

classifying the image as natural image versus an artificial image, from the feature vector; and

generating the classification of the image.

44. The computer-readable medium of claim 42, wherein the classification is performed on a set of video frames of a video sequence, and the most likely classification result emerging out of the classification results of the individual frames is taken as the class of the video sequence.

45. An apparatus to classify at least one image, comprising:

a processor;

a storage device coupled to the processor; and

a software component operative on the processor to train classification of at least

one image as either a natural image or an artificial image.

46.   The apparatus of claim 44, wherein the at least one image further comprises at least one frame in a video stream.

47.   The apparatus of claim 44, wherein the software component further comprises:

a generator of a noise vector of each of the at least one image.

48.   An apparatus to classify at least one image, comprising:

a processor;

a storage device coupled to the processor;

a software component oper+ative on the processor to train classification of at least

one image as either a slide image or an comic image.

49.   The apparatus of claim 47, wherein the at least one image further comprises at least one frame in a video stream.

50.   The apparatus of claim 47, the software component further comprising:

a generator of a feature vector from any combination of at least one feature of an

image selected from the group consisting of at least on text block feature

of the image, at least one edge feature of the image, at least one aspect

ratio of the image.

51.   An apparatus to classify an image, comprising:

a processor;

a storage device coupled to the processor; and

a software component operative on the processor to classify an image as either a

natural image or an artificial image.

5   52.   The apparatus of claim 51, wherein the classifying is performed on a set of video frames of a video sequence, and the most likely classification result emerging out the classification results of the individual frames is taken as the class of the video sequence.

53.   The apparatus of claim 51, wherein the software component further comprises:

10   a generator of a noise vector of the image.

54.   The apparatus of claim 51, wherein the software component further comprises:

a generator of a sharpness vector of the image.

15   55.   An apparatus to classify an image, comprising:

a processor;

a storage device coupled to the processor; and

a software component operative on the processor to classify an image as either a

slide image or an comic image.

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56.   The apparatus of claim 55, wherein the classifying is performed on a set of video frames of a video sequence, and the most likely classification result emerging out the classification results of the individual frames is taken as the class of the video sequence.

25   57.   The apparatus of claim 55, the software component further comprising:

a generator of a feature vector from any combination of at least one feature of an

image selected from the group consisting of at least on text block feature

of the image, at least one edge feature of the image, at least one aspect

ratio of the image.

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58.   A method to train image classification, comprising:

measuring sharpness in a first image; and

training a classification model from the sharpness, to classify a second image as a

natural image versus an artificial image, from sharpness.

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59. The method of claim 58, wherein measuring sharpness further comprises:

generating a blurred third image from the first image;

determining the difference between the first image and the third image; and

aggregating the difference into a sharpness feature vector, and

wherein training a classification model from the sharpness feature vector further

comprises:

training a classification model from the sharpness feature vector.

60. The method of claim 58, wherein generating a blurred third image from a first

image further comprises:

applying a Gaussian filter to the first image.

61. The method of claim 58, wherein the first image further comprises a frame in a

video stream.

62. The method of claim 58, wherein the first image further comprises all frames in a

video stream.